

MILK PRODUCTION AND BUSINESS ANALYSIS ON DAIRY CATTLE AFFECTED BY PMK IN “KAMPOENG TERNAK” SIDOARJO LIVESTOCK: A LITERATURE REVIEW

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Abstract

This study aims to maintain the milk production of dairy cattle infected with FMD by using additional mineral superboosters and concentrating immunoboosters in the feed. This research was conducted on the smallholder dairy cattle in "Kampoeng Ternak," Taman District, Sidoarjo, for 42 days. The material used was 18 Friesian Holstein (FH) dairy cattle suffering from FMD and decreased milk production. This research was carried out experimentally with three treatments: P0 (treatment injected multivitamins 10 ml + antibiotic long-acting 20 ml), P1 (treatment injected multivitamins 10 ml + antibiotic long-acting 20 ml and mineral super booster 40 grams), and P2 (10 ml treatment injected multivitamins + 20 ml long-acting antibiotics, adding 40-gram mineral super booster and 800-gram concentrate immunobooster). The data collected in this study is feed consumption, milk production, and profit analysis of business in the farm. The data were calculated and analyzed using anova. This literature review aims to describe adding mineral supplements to FH dairy cattle suffering from foot and mouth disease (FMD) as an alternative because it can increase milk production.

Keywords: Foot and mouth disease (FMD), mineral feed supplements, milk production, business analysis, literature review

INTRODUCTION

Indonesia has enormous opportunities in agribusiness development. Dairy farming is one of the livestock commodities that has a strategic role in meeting the food needs of the community as a source of highly nutritious animal food. The breed of dairy cattle that is commonly kept is the Holstein Friesian (FH) cattle breed which has been developed since the 1800s by the Dutch government, but milk productivity in Indonesia is currently only able to meet 23% and the rest is obtained from imports (Purwantini et al., 2021). Less optimal milk productivity in dairy cows in Indonesia is influenced by internal and external factors, environmental factors include topography, temperature and humidity, while internal factors are the nutritional needs of livestock feed (Ujang et al., 2022).

Based on previous research, Indriani (2020) stated that milk production in dairy cows produced by community farms in Indonesia ranges from 8-10 liters/head/day, this is influenced by feed factors and also the lactation period. There are several factors that affect the decline in milk production in general, namely genetics, livestock conditions, climate or season and diseases that attack dairy cows. One of these diseases is foot and mouth disease (FMD) which causes economic losses mainly due to decreased milk production, decreased labor productivity and in adult livestock increases the risk of abortion (Rochadi., 2022). As a result of the losses caused by PMK, various approaches are needed, especially with approaches through fulfilling nutrition in dairy cows.

Foot and mouth disease (FMD) is a major problem affecting animal health in the world, including in Indonesia. Controlling the spread of foot and mouth disease (FMD) is sought as an economic improvement for small breeders and developing commercial breeders. Stuart et al (2022) stated that many factors are needed in controlling foot and mouth disease (FMD), especially in providing policies on cross-border livestock or livestock traffic, having a vaccination program for livestock and increasing biosecurity in stables. Management of animal feed infected with foot and mouth disease (FMD) is also an alternative solution to meet the basic nutritional needs of livestock. (Georgina et al., 2020).

Livestock infected with foot and mouth disease (FMD) experience various clinical symptoms including fever, abortion and weight loss. According to Abdullah et al (2020) explained that in dairy cows infected with foot and mouth disease (FMD) it can result in decreased milk production and there are lesions on the udder, while in the physical condition of dairy cattle there are lesions in the mouth, there is hypersalivation and decreased consumption feed. One of the best solutions to overcome these results is the need for good feed management in dairy cows affected by foot and mouth disease (FMD) as an effort to minimize the decline in the physiological condition of dairy cows in the future.

Minerals have an important role in physiological processes, namely as growth and maintenance of livestock health. There are two types of minerals, namely micro and macro minerals. According to Siti et al (2021) various types of macro and micro minerals have an important role in maintaining optimal livestock reproductive health. Based on these problems, it is important to provide additional supplements such as superbooster minerals and immunobooster mineral concentrates as maintenance of body functions in dairy cows affected by foot and mouth disease (FMD), especially in improving the health system in dairy cows.

Foot and Mouth Disease (FMD) in Dairy Cattle

Foot and mouth disease (FMD) is a disease that attacks livestock. According to Huong et al (2022) foot and mouth disease is one of the most terrible diseases because it can damage three-quarters of livestock in total. The characteristic clinical signs of foot and mouth disease are fever, excessive salivation and lameness, accompanied by vesicles and erosion of the mouth, feet and nipples (Rahendra, 2022).

After being declared free for 32 years from foot and mouth disease (PMK), the government through the Surabaya Farma Veterinary Center (PUSVETMA) according to PUSVETMA letter No. 05001/PK.310/F4.H/05/2022 dated 5 May 2022 has announced several cases of foot and mouth disease virus (FMD) in a number of areas in East Java including Sidoarjo. According to Achmad et al (2022) stated that the spread of the foot and mouth disease virus (FMD) can spread very quickly so that it can cause significant losses to farmers. According to Ashraf et al (2022) explained that foot and mouth disease (FMD) is a disease caused by a virus from the genus Aphovirus from the Picornaviridae family which causes very significant losses in production and productivity for cattle breeders.

The impact of foot and mouth disease (FMD) losses that occur in an area can occur directly or indirectly. According to the Veterinary Research Center (2000) the losses caused by PMK are decreased milk production (25% per year), decreased growth rate of beef cattle (10% -20% longer to reach adulthood), loss of labor (60% -70% in 1st month post-infection), decreased fertility (abortion rate up to 10% and delayed pregnancy), infant mortality (20%-40% for sheep and pigs), culling of chronically infected livestock, disruption of domestic trade and livestock management, lost opportunities livestock exports, eradication costs. The death of a calf or death of an animal is one of the impacts of foot and mouth disease (FMD) which can be described in plain view, this is due to a lack of nutritional intake (cattle don't want to eat, weight loss) and weakened physical condition due to contracting foot and mouth disease (FMD) (Sudarsono, 2022). In the presence of livestock deaths due to foot and mouth disease (FMD) conducted by Dara et al (2022) explained that the deaths of young animals infected with foot and mouth disease (FMD) were carried out by post mortem examination, and changes were found in the heart muscle (myocardium) in the form of the presence of striped stripes, white, gray or yellowish (tiger heart) so that there is a lack of oxygen in the body and affects the respiratory tract.

Based on previous research conducted by Achmad (2022) explained that the economic losses due to foot and mouth disease (FMD) in livestock in Indonesia are estimated at Rp. 38.67 trillion, while the losses from cattle and buffalo reached Rp. 32 trillion, this loss is explained in the following table.

Table Economic loss of cattle and buffalo due to FMD in Indonesia.

No	Loss Type	Total (Rp billion/year)
1	Immediate Impact	
	Decreased Milk Production	1006.70
	Infertility and abortion	150.60
	Cow death	1394.49
	Weight loss	95,27
	Sub-Total	2,786.51
2	Indirect impact	
	Cutting costs	98.37
	Compensation fee	4026.08
	Supervision costs	3.95
	Surveillance costs	21.06
	Vaccination costs	105,31
	Livestock sales opportunity	16,380
	Loss of a job	9133,84
	Sub-Total	29,768.61
	Total	32555.12

Source. Ahmad (2022).

On dairy farms affected by foot and mouth disease (FMD), a very significant decrease in the productivity of dairy cows thereby reducing the production of milk produced. According to Thanicha et al (2022) explained that the economic loss in dairy farms infected with FMD is the low milk production which decreases to 60% - 80% of the initial production and is followed by the death of livestock.

Mineral Needs in Dairy Cows

Each animal feed ingredient contains nutritional elements whose concentration varies. Fulfillment of nutrition in livestock, especially in dairy cows, is the main key in order to produce good milk production. Providing proper nutritional needs to dairy cows is a factor that determines the success of a dairy business (Miarsono, Wahyu and Junianto., 2021). Menurut Muhammad (2020) explained that providing balanced quality and quantity of feed can increase the productivity of dairy cows so that there is an increase in milk production which will have a positive impact on farmer income. This is because feed quality can determine the level of livestock milk production (Novi et al., 2018).

The nutrients contained in feed generally consist of water, protein, fat, carbohydrates, vitamins and minerals. According to Bhanderi et al (2016) dairy cattle that lack minerals will have a negative impact on growth and reduce milk production. Minerals are divided into two types, micro and macro, calcium (Ca) and phosphorus (P) are the most needed minerals by the body of FH cattle because calcium (Ca) is a constituent of bone and phosphorus (P) is the bone mineralization process (Bella et al., 2020).

In dairy cows that are infected with foot and mouth disease (FMD), many experience a decrease in milk productivity, there is hypersalivation or excessive salivation and reduces fertility (Achmad et al., 2022). In general, patients with dairy cows suffer from mineral deficiencies resulting in poor reproduction (Balamurugan et al., 2017). So it is necessary to provide the right mineral components so that it can improve reproducibility in dairy cows (Ankit and Dipali, 2017).

Dairy cows that are infected with mouth disease and stiffness (FMD) experience a decrease in productivity thereby reducing milk production or even stopping production. Giving additional minerals to dairy cattle is an effort to improve the productivity of dairy cows. Based on previous research Rabiee et al (2021) explained that giving minerals to dairy cattle could significantly increase milk production by 0.93 kg/day, milk fat production by 0.04 kg/day and milk protein production by 0.03 kg/day.

Superbooster Mineral Supplements and Imunnobooster Mineral Concentrates.

Superbooster and Immunobooster are local mineral supplements containing macro and micro minerals as additional feed for livestock infected with foot and mouth disease (FMD) or healthy livestock. Provision of mineral supplements is carried out by breeders due to limited fulfillment of nutrition in livestock and limited availability of mineral-sourced materials. According to Mohammad et al (2022) livestock need high quality feed which is rich in vitamins and minerals to improve their performance. The addition of macro and micro

mineral supplements to feed is needed in small quantities, but minerals are closely related to the health, productivity and fertility of livestock, especially in the formation of milk, especially calcium (Ca) (Fazeela et al., 2022). Mineral supplements such as cobalt (Co), metal copper (Cu), manganese (Mn).

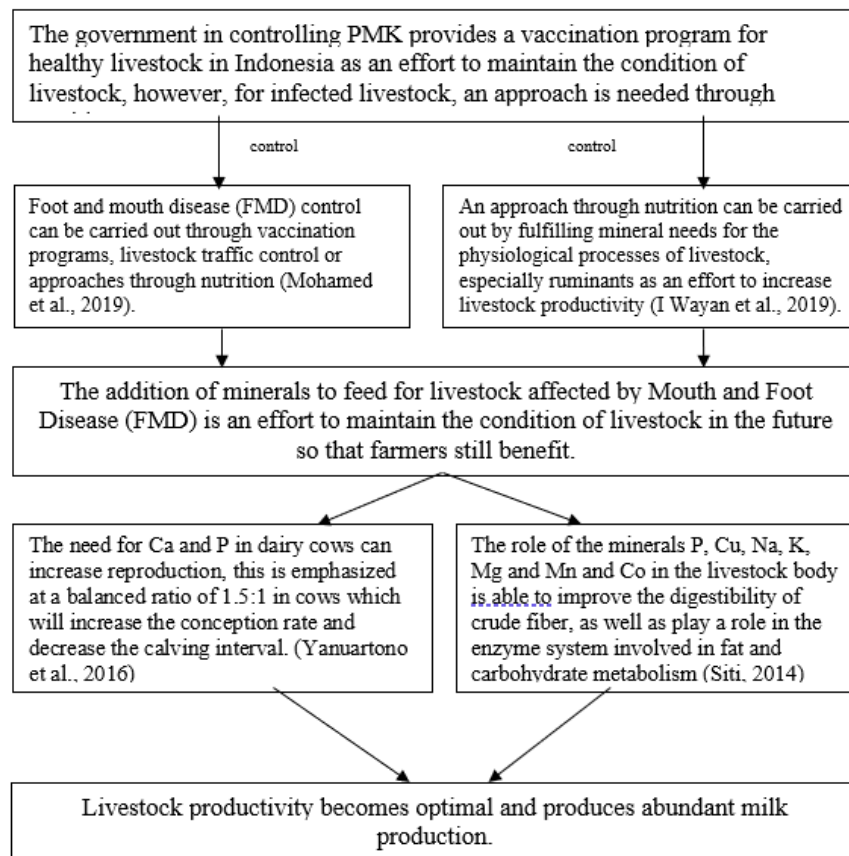
The content contained in superbooster minerals is a combination of several vitamins and macro minerals and micro minerals. The building blocks for superbooster minerals are macro minerals and micro minerals which are composed in a balanced way. The macro minerals found in this superbooster supplement are Ca (Calcium), P (Phosphorus), K (Potassium), Na (Sodium), Cl (Chlorine) and S (Sulfur) whereas, the micro minerals found in the superbooster mineral supplement these are Zn (Zink), Fe (Iron), Cu (Copper), Se (Selenium), Co (Cobalt), Mg (magnesium) and Mn (manganese). The two mineral component formulas are also enriched with multivitamins such as Vitamin A, Vitamin D, Vitamin E and B complex and essential oils made from herbs. In the immunobooster concentrate, the constituent ingredients include corn seeds, corn gluten flour (CGM), pollard, soybean meal (SBM), wheat flour, and agromix booster®. Immunobooster concentrate has a nutrient content of 89.24% dry matter, 20.82% crude protein, 8.56% crude fiber, 3.64% ether extract, 5.58% ash, and 86% TDN or total digestible nutrient printed in the form of pellets (1.5 cm long and 0.55 mm in diameter) and produced by PT. Widodo Makmur Perkasa at a feed factory in Bogor, West Java, Indonesia.

The addition of superbooster and immunobooster local minerals can be added to drinking water and mixed in feed. According to Gumarares et al (2022) sulfate sources such as copper (Cu) and zinc (Zn) metals are minerals that are very soluble in water and in acidic solutions. Giving minerals as additional feed and drinking water is an easy technique to do to minimize economic losses to farmers due to decreased livestock productivity (Cremilleux et al., 2022). The supplement formula is given to feed at a dose of 0.5% of concentrate feed. Giving mineral supplement components has a way of working that can form antioxidants such as glutathione and glutathione peroxide higher, so that they are better able to overcome oxidative stress.

Based on previous research conducted by Mohammad et al (2022) which added 0.5% essential oil and mineral mixture (Agromix Booster) to the feed ration of FH dairy cows could increase milk production but could not affect the content of milk components. However, a different study was conducted on cattle, especially on Brahman cross beef cattle which were given mineral supplements enriched with mineral B (dietic supplements and superboosters) in feed that could increase pregnancy rates (Mohammad et al, 2021).

Based on previous research conducted by Gading et al (2020) on young animals (calves) by being given feed added with additional supplements rich in minerals (Agromix Booster) has a positive effect, when compared to young animals (calf) which are not added minerals (Agromix Booster), this is indicated by increasing the immunity of calves, this is evidenced by blood tests on calves that are given additional minerals in the ration, there is more iron (Fe) and copper (Cu) which have an important role in the formation of red blood cell synthesis and is an important element in young animals as a growth support.

Research Framework and Hypotheses



Broadly speaking, the dairy farming business in Indonesia is still classified as a smallholder farm and is not yet oriented towards the economy. Whereas currently smallholder dairy farmers are experiencing new problems, namely dairy cattle infected with foot and mouth disease (FMD) experiencing various problems such as decreased productivity in livestock thereby reducing the income of farmers. Foot and mouth disease (FMD), which affects dairy cows, is characterized by fever, lesions in the mouth and nipples and reduced milk production. Other risk factors are followed by 52% higher livestock mortality after foot and mouth disease (FMD) and results in losses for smallholder farmers (Masako et al., 2022).

Physiologically healthy livestock will provide maximum benefits to breeders. In the dairy farming business affected by foot and mouth disease (FMD) a lot of medication and care is needed so that the livestock's performance is always maintained. Providing the right vitamins or minerals and providing appropriate feed for livestock will produce good livestock productivity thereby increasing the farmer's economy (Galuh et al., 2020). According to Risdawati et al (2019) prevention of economic losses for farmers is more efficient and effective when compared to the costs of treating, monitoring and caring for sick livestock. Thus, the provision of minerals in animal feed is expected to be able to increase economic benefits for farmers by producing abundant milk production.

Hypothesis

The hypothesis set in this study are:

1. The use of superbooster minerals and immunobooster mineral concentrates can increase feed consumption in dairy cows affected by foot and mouth disease (FMD).
2. The use of superbooster minerals and immunobooster mineral concentrates can increase milk production in dairy cows affected by foot and mouth disease (FMD).

CONCLUSION

The use of superbooster and mineral immunobooster concentrate can increase feed consumption in dairy cows affected by foot and mouth disease (FMD). In addition, the use of mineral superbooster and mineral immunobooster concentrate can increase milk production in dairy cows affected by foot and mouth disease (FMD).

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